

Name: _____

at1121exam_practice: Radicals and Squares (v617)

Question 1

Simplify the radical expressions.

$$\sqrt{28}$$

$$\sqrt{8}$$

$$\sqrt{75}$$

$$\frac{\sqrt{2 \cdot 2 \cdot 7}}{2\sqrt{7}}$$

$$\frac{\sqrt{2 \cdot 2 \cdot 2}}{2\sqrt{2}}$$

$$\frac{\sqrt{5 \cdot 5 \cdot 3}}{5\sqrt{3}}$$

Question 2

Find all solutions to the equation below:

$$2((x+5)^2 + 7) = 46$$

First, divide both sides by 2.

$$(x+5)^2 + 7 = 23$$

Then, subtract 7 from both sides.

$$(x+5)^2 = 16$$

Undo the squaring. Remember the plus-minus symbol.

$$x+5 = \pm 4$$

Subtract 5 from both sides.

$$x = -5 \pm 4$$

So the two solutions are $x = -1$ and $x = -9$.

Question 3

By completing the square, find both solutions to the given equation. *You must show work for full credit!*

$$x^2 - 16x = -55$$

$$x^2 - 16x + 64 = -55 + 64$$

$$x^2 - 16x + 64 = 9$$

$$(x - 8)^2 = 9$$

$$x - 8 = \pm 3$$

$$x = 8 \pm 3$$

$$x = 11 \quad \text{or} \quad x = 5$$

Question 4

A quadratic polynomial function is shown below in standard form.

$$y = 4x^2 + 24x + 45$$

Express the function in **vertex form** and identify the **location** of the vertex.

From the first two terms, factor out 4 .

$$y = 4(x^2 + 6x) + 45$$

We want a perfect square. Halve 6 and square the result to get 9 . Add and subtract that value inside the parentheses.

$$y = 4(x^2 + 6x + 9 - 9) + 45$$

Factor the perfect-square trinomial.

$$y = 4((x + 3)^2 - 9) + 45$$

Distribute the 4.

$$y = 4(x + 3)^2 - 36 + 45$$

Combine the constants to get **vertex form**:

$$y = 4(x + 3)^2 + 9$$

The vertex is at point $(-3, 9)$.